

California Water Management; Subject to Change



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The Reclamation Board
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DWR Technical Memorandum Report

July, 2006

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www.baydeltaoffice.water.ca.gov/climatechange.cfm



EXECUTIVE ORDER S-3-05

June 1, 2005

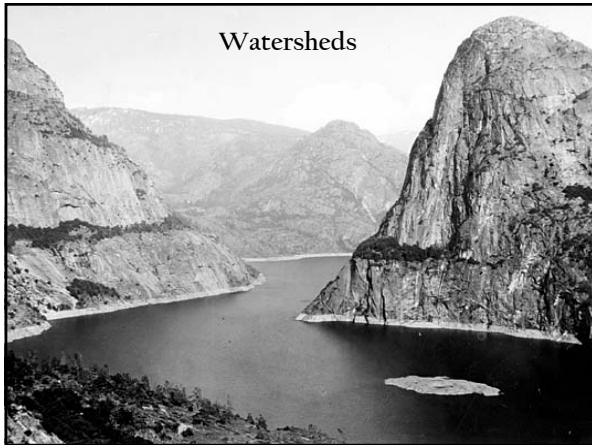
- Recognizes global climate change and its impacts on California.
- Establishes aggressive greenhouse gas emission reduction targets for the State.
- Requires biennial assessments of climate change impacts and the development of impact mitigation/adaptation plans.
- Requires the formation of an interagency team to implement the Governor's Order.

Climate Change Impacts on California's Water Resources



- Reduced snowpack, impacting water supply and hydropower
- Earlier snowmelt results in increased flood control demand on reservoir space
- Higher water temperatures impacts ecosystem
- Sea level rise impacts the Delta, threatens levees and increases salinity
- Increased demand in all sectors

Watersheds



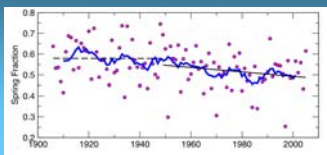
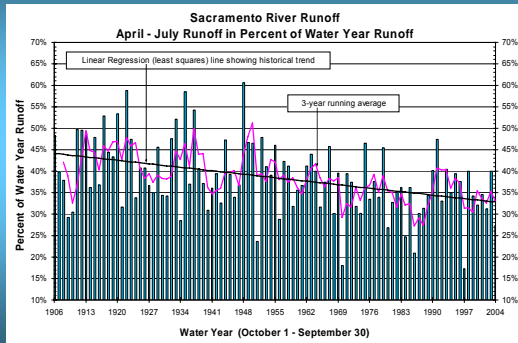


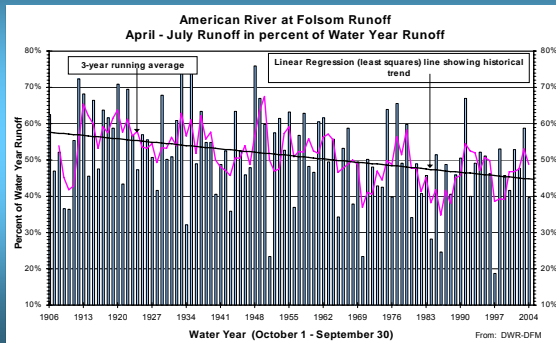
Figure 2-17 Annual April through July Unimpaired Runoff in the Central Valley Compared to Total Unimpaired Annual Runoff

Source: Deininger, 2004a, updated by original author.
 Explanation: Individual points depict yearly combined values for the Sacramento River at Bend Bridge near Red Bluff, Feather River into Lake Crowley, Yuba River at Bearville, American River below Folsom Reservoir, Stanislaus River into New Melones Reservoir, Tuolumne River into Oak Pools Reservoir, Merced River into Lake McClure, and Kings River into Pine Flat Reservoir. The blue curve is the nine-year moving average of annual values. The dashed line is the linear trend prior to 1945. The solid line is the linear trend after 1945.

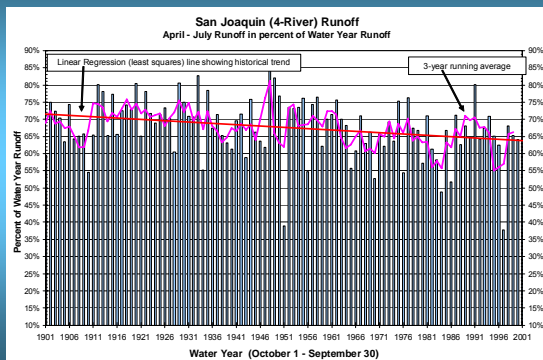
Changes in Runoff Timing

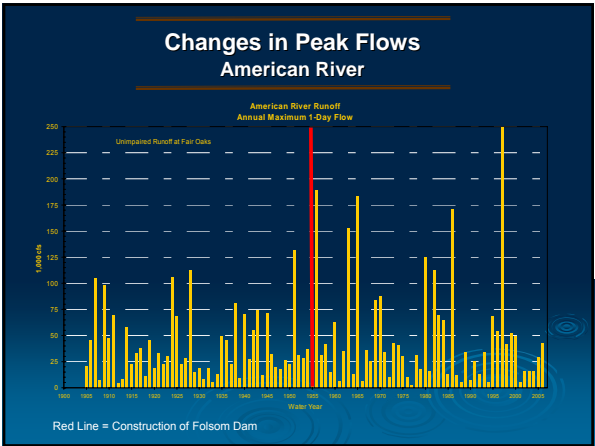


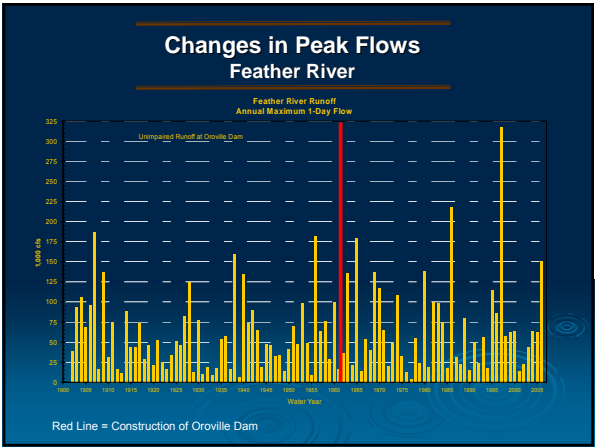
Changes in Runoff Timing

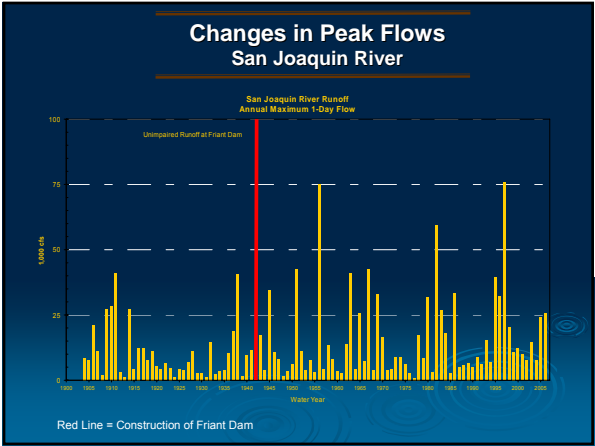


Changes in Runoff Timing



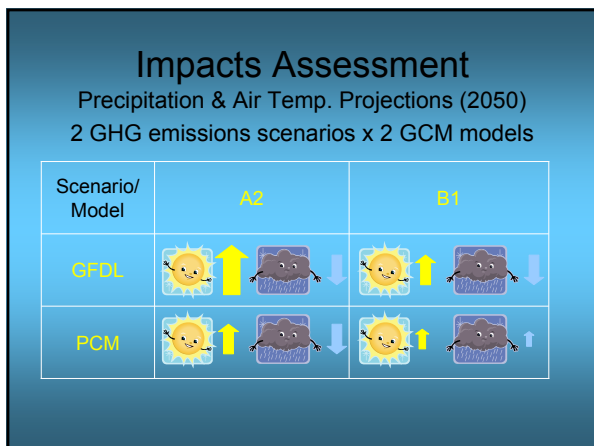


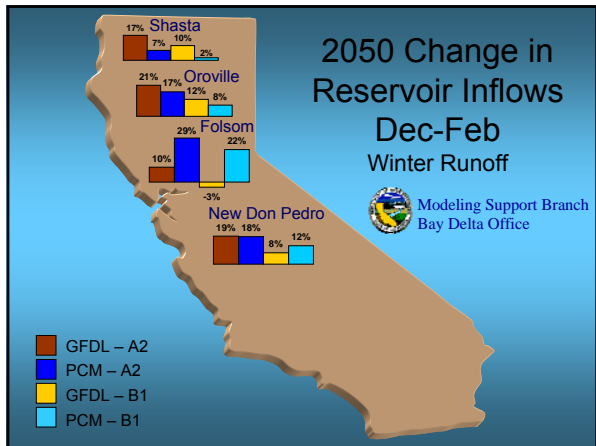


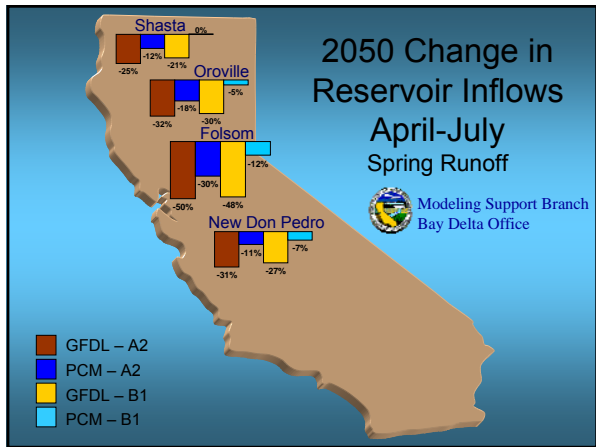






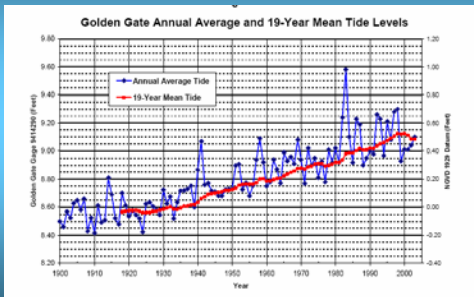








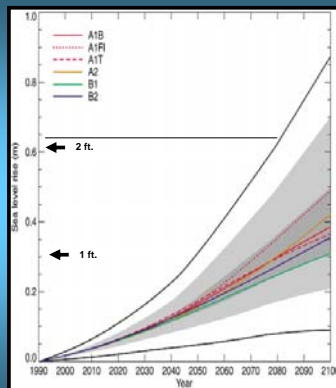
Sea Level Rise



Source: Roos 2003

Sea Level Rise

Projections



Source: IPCC, 2001

Implications of Rising Sea Level for the Delta

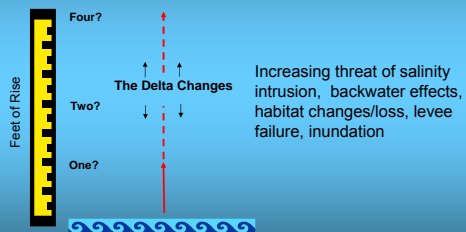




Figure 2-32 Impact of One Foot of Sea Level Rise on the Relative Effect of Astronomical Tides in the Delta
Source: Lawrence Berkeley National Lab (Miller, 1998).



Minimum Levee Crest Elevations



Levee Overtopping Potential

Overtopping potential: simulated channel water level \geq crest elevation

Location	# of Potential Overtopping Events in 16 yrs			
	Base	4 Climate Change Scenarios	1 ft SLR	4 Climate Change Scenarios +1ft SLR
Sherman Is	0	0	2	2
Twitchell Is	0	0	2	2
Jersey Is	0	0	2	2



California Water Management and Climate Change

- Climate change is real.
- Climate change presents significant challenges for the management of California's water resources.
- Climate change is occurring incrementally and will likely continue to do so based on historical records over the past 100 years and most projections.
- California's water management systems already provide a great deal of operational flexibility.
- We should have time to plan for future climate change and then adapt to it.

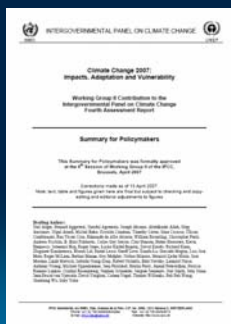
Climate Action Team

- ❑ CalEPA Secretary Chairs the Team
- ❑ BT&H, CDFA, Resources, PUC, ARB, CIWMB, and CEC are Represented
- ❑ The CAT Report:
 - Key Recommendations
 - Emission Reduction Strategies
 - Market-Based Program
 - Scenario Analysis
 - Environmental Justice Considerations
 - Final Report to Governor and Legislature in March 2006 (Updated Biennially)

Assembly Bill 32

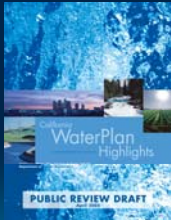
- ❑ Global Warming Solutions Act of 2006
- ❑ Reduce GHG emissions to 1990 levels by 2020 (30% reduction)
- ❑ Applies to Kyoto pollutants
 - CO₂, CH₄, N₂O, HFC, PFC, SF₆
- ❑ Detailed action schedule

New IPCC Findings



- Confirms impacts we are already witnessing
- Emphasizes the importance of adaptation
- Impacts dependent upon both climate change and adaptive capacity
- Recommends a portfolio approach

Framework for Action Sustainable & Reliable Water in 2030



Vision
Initiatives for Reliability
Foundational Actions for Sustainability



Climate change is the sole focus of one of the 14 major recommendations

Resource Management Strategies

Reduce Water Demand

- Agricultural Water Use Efficiency
- Urban Water Use Efficiency

Improve Operational Efficiency & Transfers

- Conveyance
- System Reoperation
- Water Transfers

Increase Water Supply

- Conjunctive Management & Groundwater Storage
- Desalination – Brackish & Seawater
- Precipitation Enhancement
- Recycled Municipal Water
- Surface Storage – CALFED
- Surface Storage – Regional/Local

Improve Water Quality

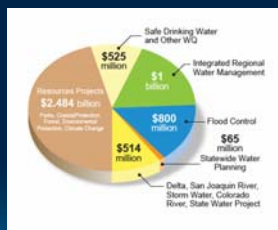
- Drinking Water Treatment and Distribution
- Groundwater/Aquifer Remediation
- Matching Quality to Use
- Pollution Prevention
- Urban Runoff Management

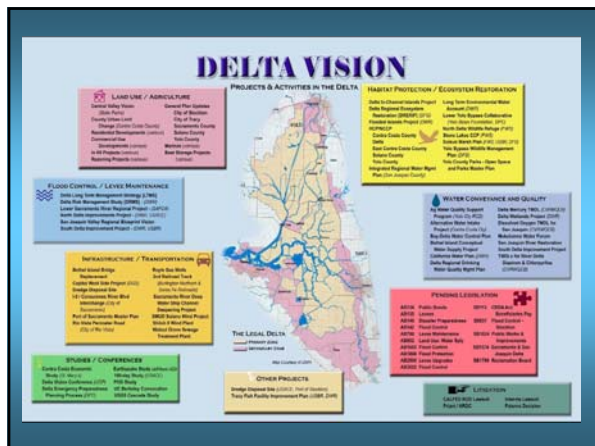
Practice Resource Stewardship

- Agricultural Lands Stewardship
- Economic Incentives (Loans, Grants, and Water Pricing)
- Ecosystem Restoration
- Floodplain Management
- Recharge Areas Protection
- Urban Land Use Management
- Water-Dependent Recreation
- Watershed Management


Proposition 84 Water Management Programs

- Integrated Regional Water Management
- Delta Water Quality
- State Water Planning
- Colorado River
- San Joaquin River Restoration





Water, Energy and Climate Change



Future water management activities must consider strategies to reduce greenhouse gas emissions



Bonus Features

- Governor;
S-3-05 targets
- GHG emissions
- Main Menu



Executive Order Established Statewide GHG Targets

By 2010, Reduce to 2000 Emission Levels*
By 2020, Reduce to 1990 Emission Levels**
By 2050, Reduce to 80% Below 1990 Levels

* Equals ~60 Million Tons Emission
Reductions, 11% Below BAU
** Equals ~170 Million Tons Emission
Reductions, 30% Below BAU



Climate Change Emissions -- California

